BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 27, 1969

EXAMINER HEARING

IN THE MATTER OF:

Application of Mobil Oil Corporation for a unit agreement, Lea County, New Mexico.) Case No. 4201

Application of Mobil Oil Corporation for a waterflood project and unorthodox injection well locations, Lea County, New Mexico.) Case No. 4202

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

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MR. UTZ: Case 4201 and 4202 will be consolidated for the purposes of testimony and separate orders will be written.

MR. HATCH: 4201. Application of Mobil Oil Corporation for a unit agreement, Lea County, New Mexico. And Case 4202, application of Mobil Oil Corporation for a waterflood project and unorthodox injection well locations, Lea County, New Mexico.

MR. UTZ: Appearances?

MR. SPERLING: James E. Sperling, Modrall, Seymour, Sperling, Roehl and Harris, Albuquerque, appearing for the Applicant. We have one witness.

MR. UTZ: Any other appearances?

MR. EATON: Paul W. Eaton, Jr., Hinkle, Bondurant and Christy, Roswell, New Mexico, appearing for Atlantic Richfield Company in Case 4202.

MR. UTZ: Swear the witness, please.

(Witnesses sworn.)

MR. UTZ: You may proceed.

(Whereupon, Applicant's Exhibits 1 through 3 were marked for identification.)

PAT KELLY

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Please state your name, your place of residence, the name of your employer and the capacity in which you are employed.

A My name is Pat Kelly, I live in Midland, Texas, and I work for Mobil Oil Corporation as a petroleum engineer.

Q Mr. Kelly, have you on any previous occasion testified before the Commission, so that your qualifications as a petroleum engineer are a matter of record?

A No, sir.

Q Would you please give a brief resume of your educational background, leading to an engineering degree, and your experience in this field.

A I studied petroleum engineering at Texas A & M University, and I graduated with a BS degree in petroleum engineering in 1954. I started to work immediately for the railroad commission in its Corpus Christi District Office as a field engineer.

Thereafter, I served two years in the Air Force,

completing that obligation in 1957, when I returned to the railroad commission and was assigned as an engineering examiner, where I served in such capacity for eight years. In 1965, I was employed by Mobil Oil Corporation as a petroleum engineer and have served in that area since that time.

Q Mr. Kelly, are you familiar with the area which is the subject of the application in these matters?

A Yes, sir.

Q And what connection has your association been with the area?

A That of a petroleum engineer?

Q Yes, sir.

A I have had occasion to make some studies of properties, producing properties, in the Queen Formation in that area, which resulted in Mobil's purchase of some properties, which we are preparing to waterflood following their unitization.

Q Would you state briefly what is sought by the application pertinent to Case 4201?

A Pursuant to the application, styled in Case No. 4201, it is Mobil's request that the unit agreement covering the Langlie-Mattix Queen Unit, in Lea County, New

Mexico, be approved.

Q Would you please refer to what has been marked in Case 4201 as Exhibit No. 1 and advise the Examiner what that is?

A Exhibit No. 1 is the unit agreement that has been prepared covering Langlie-Mattix Queen.

Q Now, would you please identify what's been marked in that case as Exhibit No. 2 here?

A Exhibit 2 is an area plant showing the Langlie-Mattix Queen Unit Area in the approximate center of the plat and showing all of the acreage within a two-mile radius of such property.

It also shows the Gulf operated Stewart Langlie-Mattix Unit immediately offsetting the proposed Langlie-Mattix Queen Unit to the north, and it shows also the Langlie-Mattix Woolworth Unit, operated by Amerada for waterflooding in the Queen Formation, about two miles north of the proposed unit.

Q Now, contained within the unit agreement is a map of the unit area; is it not?

A Yes, sir. There is in the back of the unit agreement a plat marked Exhibit A, which shows the location of all the wells in the unit, and shows the unit

boundary, which encompasses some one thousand forty acres or so.

Q Now, is this area or has this area been productive in the particular formation with which we are concerned? By the way, you might explain what the unitized formation is.

A The unitized formation is to be that interval within the Seven Rivers and Queen Formations, described by the Conservation Commission as comprising the Langlie-Mattix Pool.

That interval takes in the lower one hundred feet of the Seven Rivers Formation, together with all of the Queen Formation.

Q Now, please refer to what has been marked as Exhibit No. 3 in Case 4201 --

MR. UTZ: Do you have another copy of the exhibit? Oh, I'm sorry -- go ahead.

THE WITNESS: Exhibit 3 is a log of the Gulf Oil Corporation, J. A. Stewart, Well No. 9, located three hundred and thirty feet from the north and east lines of Section 10, Township 25 South, Range 37 East. That log is marked at the top of the Queen Formation -- top of the

Penrose Formation, which is a part of the Queen, the lower Queen, and is also marked at a depth of one hundred feet above the top of the Queen and it is marked at the base of the Queen, which coincides with the top of the Grayburg.

The entire interval extending from one hundred feet above the top of the Queen down to the base of the Queen is the unitized interval.

Q Mr. Kelly, give us, briefly, a resume of the history of the development within this particular unit area as described in the unit agreement?

A The Langlie-Mattix Pool was discovered sometime in the 1930's. The first production that was found on proposed Langlie-Mattix Queen Unit was the Sun Oil Company Stewart A, Well No. 1, drilled in location B of the Section 15, Township 25, Range 37.

In May, 1936, there were three additional wells completed in the Queen in 1936, fourteen in 1937, five in 1938, two in 1939 and one each in 1947, '66 and '68.

This brings the total development within the unit area to twenty-eight wells. Those wells, for the most part, were completed open hole, with casing set on

top of the pay. In general, they were shot with some nitrogylcerin.

To the end of 1968, the unit area had produced three million two hundred thirty-eight thousand barrels of oil from the Queen Formation.

Q Before continuing with 4202, has the unit agreement, which has been identified as Exhibit No. 1 been submitted to the USGS? I notice that there is federal acreage included within the unit area --

A Yes, sir. Tract 1 operated by Pan-American Petroleum Corporation is a federal tract. The USGS has been consulted in preparation of this agreement and has indicated that it will approve an agreement drawn along the lines of one that has been corrected by them and furnished to us, and this unit has been prepared written along those lines.

And I have confidence that they will approve it.

Q In other words, Exhibit 1 represents a revised unit agreement following its summation to USGS for comment?

A Yes, sir. The first draft was revised according to the comments of the USGS.

Q Now, what percentage of the working interest

does Mobil have within the unit area?

A The unit area is to be operated under the agreement, under a two-phase formula. During phase one, which continues until twenty-three thousand barrels of oil have been produced from and after July 1, 1969, from the unit area.

And phase two begins at the first, on the first day of the month following the exploration of production of twenty-three thousand barrels, and continues thereafter. Phase one is based upon current revenue for the year 1968, for each tract. And phase two is based seven percent on acreage and ninety-three percent on tract accumulated production, as of January 1, 1969.

Mobil's participation, working interest participation, under phase one, is 85.4925 percent and, under phase two, 73.4878 percent.

Q What is the present status of the sign-up of the unit agreement by the various interest owners, both interest owners and royalty interest at this time?

A The unit agreement was only submitted through mail to the working and royalty interest owners on August 13. As of this morning, working interest sign-up,

exclusive of Pan-American Petroleum Corporation, had amounted to 89.4 percent -- weighted according to phase two participation.

Pan-American has furnished Mobil with a letter which states that it has not yet signed the unit agreement, but that it is being processed and that it will be signed, and they authorized us to make that representation to the Commission. With Pan-American's signing the unit will be committed to by ninety-three and a half percent of the working interest owners. As of this time, there are twenty-seven percent of the royalty interest owners which have committed their interest to the unit, according to phase two participation.

Q Do you anticipate any particular problem, other than the lapse of time in completing the execution by the interest owners?

A No, sir. I expect this sign-up to continue at something like the rapid pace that it's progressed at so far.

Q Is the form of the unit agreement, allowing, of course, for certain local variations, a standard form of unit?

A Yes, sir. It's patterned after a federal form.

Q Do you have anything else to add in connection with the unit itself, as contained in the application of 4201?

A I believe not.

MR. SPERLING: I would like to offer at this time, Mr. Examiner, Exhibits 1 through 3 in Case 4201.

MR. UTZ: Without objection, Exhibits 1 through 3 will be entered in the record in this case.

MR. SPERLING: Unless the Examiner wants to inquire as to Case 4201 at this time, we will proceed with that portion of the testimony --

MR. UTZ: The purpose of this unitization is for a secondary recovery; is that correct?

THE WITNESS: Yes, sir.

MR. UTZ: That's all I have.

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Q (By Mr. Sperling) Mr. Kelly, with reference to application in 4202, would you state briefly what is sought by that application?

A As a result of the application styled in 4202, Mobil wishes to achieve approval of authority to carry on waterflood operations in the unitized interval beneath

the Langlie-Mattix Queen Unit, using the injection wells which are listed in an attachment which will be made an exhibit in this hearing. And we ask also that the water-flood be operated under Rule 701 E, with regard to the future expansion and allowable.

Q All right. Please refer to what has been marked in 4202 as Exhibit No. 1, which I think is an identical exhibit as Exhibit 2 in 4201.

A Yes, sir; Exhibit 1 is the area plat to a scale of one-inch to four thousand feet. It shows all of the acreage within two-miles of the proposed unit.

Q Now, refer to Exhibit No. 2 and explain what that exhibit shows.

A Exhibit 2 is a map showing the waterflood pattern, which is in the main, an eighty-acre five spot, modified where necessary to conform to the current or planned injections on offset properties, and also, modified to reduce the drilling of additional wells, where possible, to complete the pattern.

Some of the patterns are a little larger than eighty acres. And one or two of them may be a little smaller. In the main, it's an eighty-acre five spot pattern.

The dash lines on the plant, connect wells, which are to be injectors in the waterflood.

Q Now, how many wells are planned as injector wells?

A We plan, ultimately, to utilize seventeen wells for injection.

The wells will include six that will be drilled for injection purposes, and eleven that will be converted. Two of the wells proposed for injectors will not be used initially.

Well No. 30 will be converted to injection after it waters out, down on the south end of the unit, and well No. 14 will be drilled in all probability, in January or February of 1970, to complete the two waterflood patterns that it supports.

Q This will result in how many producing wells within the unit area?

A Ultimately seventeen producing wells. We will have an even number of producers and injectors, a total of thirty-four wells on the unit. They are currently -- the twenty-eight holes that have been drilled on the Queen on the unit.

Q Now then, in connection with the injection wells proposed, please refer to what has been marked as Exhibit 3 and explain what that is.

A Exhibit 3 is a tabulation of the wells that Mobil proposes to use for water injection.

The first tabulation lists those wells that will be converted to injection. They are currently producers, and the second tabulation lists those wells that will be drilled for injection use.

The tabulation shows, in addition to the unit well name, the current name that the wells are operated under. Their location in each section, township and range. And with respect to the wells that will be drilled, the tabulation shows their location, with respect to the nearest section lines, township and range.

There is a discrepancy between the locations shown on Exhibit 3, for three of the wells that are to be drilled, as compared with the similiar tabulations that was submitted within the past week or so, through the mail, to the Oil Conservation Commission.

Those wells are No. 14, 15 and 32. The tabulation, initially furnished the Commission, was in error, with

respect to those well locations. The locations that are shown on Exhibit 3 are the correct locations.

In the case of 14, for example, the surveyor had reported to the individual, transmitting that information to the Commission, a tie on an injection line junction, rather than the well itself. In well No. 15, the surveyor had incorrectly concluded a statement of the locations. The federal authorities would not permit a rig to be raised at the location that I wanted the well at, because it's close to an air strip. We cleared that up with the federal authorities, and have shown on this listing the location that we think will be acceptable to them for a rig to be raised.

With respect to well No. 32, the surveyor learned after the first list was transmitted to the Commission that a surface obstruction would prevent rigging up over the location contained in the tabulation, and the location described on Exhibit 3 for well 32 is one that we can rig up over.

Q Well, then the changes that you have just described result from changes in footages from those previously submitted to the Commission; is that right?

A Yes, sir. There isn't any material difference in the locations that I can see. A few feet in each case.

Q Now, would you give us a brief background of the geologic conditions that prevail in this area with reference to the proposed unitized formation?

A Referring back to Exhibit 1, the area plant, I might point out that the Langlie-Mattix Queen Unit is situated geographically on the west flank of the justice anticline. The crest of the anticline is a short distance east of the unit, approximately one mile, perhaps two miles east of the unit.

The Queen Formation, together with the lower Seven Rivers was contained initially -- contained initially a substantial gas cap which lay on top of an oil column. The gas cap blanketed the crest of the structure and invaded the east side of the Langlie-Mattix Queen Unit.

The oil column lies in a narrow band in this area, about one-mile wide, trending north and south. The injection pattern, that we had planned, that we had put together here, is designed in part to create a barrier, a water barrier, between the oil column and the gas cap, which lies up-dip, to prevent oil from being pushed up into that gas cap, where I am certain it will not be recovered.

Q Have you any other pertinent information as far as the geological conditions are concerned?

A Well, I might point out that the Queen Sand, that we are going to waterflood, is comprised of sand stringers, enters first with dolamite members. Some of these stringers, the sand stringers correlate very well from well to well, where you have logs, but there aren't very many logs in this area.

There are porous members in the lower Seven Rivers. Also, in the upper Queen, and also in the Penrose, that I think contain oil; and I expect to flood concurrently in order to recover some additional oil.

As things stand at this point to production of the unit, it is very near the economic limit, and it is essential that some form of secondary recovery operations be carried on to justify continued operations of the property.

Q Well, in that connection with reference to the production history of this particular area, please refer to what has been marked as Exhibit 4 and indicate what that is designed to show.

A Exhibit No. 4 is a tabulation of production from the unit, oil production. It shows also the number of

producing wells and barrels per day, average barrels per day of oil produced. The tabulation just goes back to 1959. Production did start in 1956 on the unit. Accumulative oil, at the end of each year, is shown alongside the production tabulation, and for the year 1969, production has been set out on a monthly basis, showing that the twenty currently producing wells are making about a barrel and a half of oil a day on an average and during the month of April.

Q Now, concerning your testimony just given with reference to production and the tabulation that you have identified as Exhibit 4, refer to Exhibit 5, which appears to be related, and identify that, please.

A Exhibit 5 is a graphical representation of the same data that is contained, with respect to oil production, on Exhibit 4.

Q Now, would you explain what is contemplated with reference to the installations; the quantity of water that you contemplate injecting, the injection rates, pressures; in other words, a general description of the mechanical installation that you expect to utilize?

A We are intending to obtain supply water from the Grayburg San Andres interval, from a supply well that

will be drilled on the unit in the near future.

This is what is called rough water. It has some H_2S in it. We have an injection station designed to handle that water, and the station will pump at eight hundred pounds surface pressure, 13,500 barrels per day. We won't initially have enough injection wells in service to use all that water. And do intend to inject initially at an average well rate of 750 barrels per day, and intend to restrict the surface injection pressure to one thousand pounds.

I think that we will have very few wells that pressure up within the first year to one thousand pounds. During the second year, I think that injectivity will fall off to perhaps eighty-five percent of the first year, and I expect that we will be able to maintain average injection rates of about five hundred barrels per well per day thereafter.

The station is designed, if necessary, to carry us up to 1800 pounds of surface pressure. I think, in all probability, we won't have to exceed fifteen hundred pounds.

It may be well to point out that the contracts are in the process of being let for the injection station, and I think that construction may well start within the next ten or fifteen days.

Q Now, please refer to what has been marked as Exhibit 6, which is, I believe --

A Exhibit 6 is a log of a well that is not on the Langlie-Mattix Queen Unit; it is on another unit which is the subject of a further hearing this afternoon, the Humphrey Queen Unit. It happens to be the only injection well that we have thus far drilled on either unit, and so, it's the only one that we have a log on.

Marked on that well log, which is identified as our Humphrey Queen Unit No. 20, or the fee name is Liberty Well No. 6.

It was drilled five feet from the west line and one hundred feet from the south line of Section 3, Township 25, Range 37. It shows the entire interval that we expect to be injecting into, which goes from one hundred feet above the top of the Queen, down to the lowermost forced member in the Penrose Section.

Q Well, then, you expect the log which you have just identified as Exhibit 6 to be representative of a typical log of the injection wells which you've proposed, both as they now exist or as they are to be drilled?

A Yes, sir. That log will not show the identical

porosities that we will find in later wells, I'm sure, but it does show the entire interval, and I would class it as a typical injection well.

Q Now, would you please refer to what has been marked, collectively, as Exhibit No. 7, which appears to be diagramatic sketches of completions.

A Exhibit No. 7 is a sheet of well sketches, showing the proposed or existing completion arrangement under injection operations in each case.

The existing wells that will be converted are, for the most part, going to be completed in open hole, as they are now, with a tension packer set a short distance above the casing chute; with injection to take place through cement lined tubing. The casing anulus, in each case, will be loaded with treated water to inhibit corrosion.

The wells that we are going to drill, which on the -- Langlie Unit, No. 6, will all be completed through perforation; they will be cased through the pay, and the porous members, and the porous members selectively perforated, and cement lined tubing set on a packer, above the uppermost perforation and with the casing also loaded with treated water.

The casing in each case, both the surface pipe and the long string will be cemented back to the surface.

Q Any other features you would like to mention with reference to the method of completion of these wells?

A I can't think of anything else. I believe the completion method that we propose will confine the injected water to the pay.

I don't invision there being any likelihood of its escaping to a fresh water zone and to the surface under this arrangement.

MR. SPERLING: That's all we have, Mr. Examiner.

CROSS EXAMINATION

BY MR. UTZ:

Q Now, in regard to Exhibit No. 7, Mr. Kelly, did you state whether or not the tubing would be plastic coated?

A The tubing will be cement lined, as will all of the surface injection lines.

Q And are you going to load the anulus --

A With treated water; yes, sir.

Q What are you going to do with the surface of the anulus?

A It is the practice of Mobil to periodically check the casing anulus for the presence of any pressure, and, of course, when it's demonstrated, why, we know we

have got a leak somewhere and set about to correct it.

Q Well, do you leave it open or --

A There will be a valve on it. I don't know whether there will be a gauge on it or not. A lot of times a pumper will carry a gauge around in his pickup, and just screw it into a valve -- if a well won't bleed down immediately, well he opens it up.

MR. UTZ: Any other questions?

CROSS EXAMINATION

BY MR. EATON:

Q Mr. Kelly, with reference to Exhibit 3, what is the distance of unit well number 14 from the north line of Section 14?

A Unit Well No. 14 is to be 660 feet south of the north line of Section 14.

Q Thank you. As you inject water into the formation, what physically happens?

A I think the water enters the porous member, the porous and permeable members, and expands out according to injection within those members.

Q Does it tend to expand out radially?

A Theoretically, it does. It doesn't always, but we make that assumption, usually. It depends on the permeability orientation. I haven't any reason to think

that the water will not expand radially around the wells.

Q Is there any pressure effect that is set up in the formation with the water moving out through the formation?

A The injection of water into a reservoir rock takes place because of a pressure differential, yes, sir. There is a pressure differential from the well bore to the front of the -- flood front; the bleeding edge of the flood front.

Q Then what happens when water from two injected wells, moving toward each other -- what happens when the water meets?

A It goes to the direction of the least pressure.

Q I believe you testified that Well No. 14 will probably be drilled in January or February of 1970?

A Yes, sir.

Q Why do you propose to drill that well at that time?

A The main reason that I have proposed to delay drilling of that well -- to the first part of next year, is to allow sufficient time for Atlantic, if it so chooses, to accept the offer that Mobil has made to it for the currently abandoned or temporarily abandoned well, offsetting proposed well number 14 to the northeast on the Stewart A lease -- because I believe I can tolerate that much delay.

I can tolerate two or three months delay in getting that well on injection, but I can't tolerate anymore than that.

Q Now, do you think that well number 14 is -- is that an ideal location for an effective waterflood sweep?

A No, sir. I don't think it's an ideal location. It's the best location I could find on the unit, on the east side. I don't think there is a better location anywhere on the unit.

Q On the unit?

A Yes.

Q Would you feel that perhaps a location on the Stewart lease may be better than the present well 14 location?

A I think that's highly debatable. The location of what was formerly Sinclair's, and is now Atlantic's Stewart A No. 1, would lend itself to use as an injector and might result in some additional recovery, although it's my opinion that the magnitude of the additional recovery would be of a low order.

The principal benefits that could be derived out of injecting into the Stewart A No. 1, rather than the well number 14, would arise out of the elimination of the need to spend money drilling a well.

Q How about much money does it cost to drill one of the injection wells?

A We have estimated the cost at $38,000 per well, to drill and complete through perforations.

Q How much do you think it will cost to enter, for example, the Stewart No. 1 well and prepare it for injection?

A I have not prepared an estimate of the cost of doing that work to Stewart A Well No. 1. If I were able to make the assumption that we would encounter no trouble, that the well doesn't have a casing leak or a collapsed casing or -- I should think that we would be able to complete it for injection for somewhere in the neighborhood of ten to thirteen thousand dollars.

Of course, that would be an open hole completion. We wouldn't set a liner with that. And there would be -- well, there is a factor to consider and it is how well you can control where the water goes. You have almost no control in an open hole interval, but you can mechanically control the water -- where the water goes when you have your pipe perforations.

Q Now, if you do go ahead and drill well number 14 in five or six or seven months, and start injecting at that time, I assume that well number 13 will have been in

operation for a while before that time?

A My estimate right now is that by the time we get well number 14 drilled and completed, well number 13 will probably have been on injection for about two and a half to three months.

Q Mr. Kelly, I would assume then that when you start injecting water into well number 14, that there would be a tendency for water to move somewhat rapidly eastward?

A Probably so. I think it would move rapidly in all directions, really. But the area to the east, I am sure, has a higher gas saturation than the area to the west. And I think that it will probably have a higher permeability to water than to the area to the west, and it's also true that the water would probably move a little faster to the east than it does to the west.

Q Also, you would have the pressure problems to the west because of the injection in the well number 13?

A I am almost certain that there would have been no interference within a three month period.

Q Well, at such time as the water injected in number 14, moving westwardly met the well, the water injected in well 13, then there would be a tendency for the well number 14 water to move more easily to the east,

rather than continue westwardly at the same rate?

A If I can make the assumption that the permeability of the rock stays the same, I think that's true.

Q Well, at the outset, I think you said that's true?

A Yes, sir. I think so. It depends on the pressure differential, if we run into a hard streak out there, it will slow down.

Q Do you have any idea as to how soon you think the Stewart A well would be watered out after you started injecting in the well number 14?

A No, sir. I haven't formed an estimate of that. I do know that the Stewart A No. 1 is approximately the same distance from our proposed injector number 14, as our wells, our unit wells number one and eight are from Gulf's Stewart Langlie-Mattix No. 28, which has been on injection December of 1968.

And as far as I can tell, we have seen no effect from that injection as yet in those wells. But, of course, I think there is a high oil saturation down here, and the water would tend to move slower through the area of high oil saturation than it would through an area of high gas saturation, I think.

MR. EATON: That's all I have.

REDIRECT EXAMINATION

BY MR. SPERLING:

Q I have another question or two on redirect. Mr. Kelly, what is the present status of the Atlantic A 1 Stewart?

A The best information that I have, is that it is temporarily abandoned or shut-in. Information in this line has been communicated to me, verbally, by some of the people that were formerly interested in the well in Sinclair.

Q Do you know how long it has been temporarily abandoned?

A Well, I have -- I'm not sure that it has been temporarily abandoned all that time, but the production records don't show any production for it since 1963.

It began production in 1938, and through 1953, it made 61,047 barrels of oil. It shows no production for the years 1954 through 1957.

It shows 917 barrles of oil in 1968. A 116 barrels of oil in 1959, along with 37,720,000 cubic feet of gas.

And it shows on the gas production for 1960 through 1963. Since that time, there hasn't been any

production recorded in the publication for the well. I assume it's been shut-in. It may have been plugged -- I don't really know. I doubt if it's been plugged, I think it's been, just been shut-in.

Q Do you have any information as to the condition of that well?

A I have the information that was reported on the scout ticket, at the time of its completion. I have some other information that has been gleaned from O. C. C. Miles in Hobbs. I do not have information indicating what the situation is in the well bore at this time.

MR. SPERLING: I believe that's all.

RECROSS EXAMINATION

BY MR. UTZ:

Q Mr. Kelly, have you been in contact with Atlantic Richfield regarding the oil in this unit?

A No, sir.

Q Would you be willing or would Mobil be willing to accept the unit?

A Well, of course, Mobil is one of the working interest owners, and the working interest owners collectively make those decisions. From my own standpoint, I would have

no objection to the lease being brought into the unit on an equitable basis. And if we had been or should be successful in purchasing the lease, well it would be our intention, if we are able to unitize the royalty to negotiate it into the unit on an equitable basis.

Q By equitable basis, you mean on the same basis that the rest of it had been agreed upon?

A No, sir. I don't think that basis would afford protection to the remaining interest in the unit. I think if the lease were to participate on the same basis that the other interest would be watered down to an unwarranted degree.

The phase two participation of the well, the tract would approach two percent on the basis of the rest of the properties. When you look at the location of the well, you can see that it's as far down dip as the -- as a regular location can be drilled on the lease. As is, the adjoining well to the west is as far down dip as the location can be drilled on the lease, a regular location.

I am confident that a good quantity of the oil that has been produced from the Stewart A No. 1 has come from the adjoining area to the west. Any regular drainage pattern would lead you to that conclusion.

I think the amount of oil that the lease would contribute to the unit is -- is somewhere in the neighborhood of one-fifth to one-seventh of the amount of oil that the tract would be credited with if it were to participate under the same phase two formula that the rest of the tracts had come in under. I think this is because the lease hasn't made any oil in a long time. The well is very close to the lease line.

There just isn't any acre feet there to sweep. And those that are are characterized by high gas saturation, and I would expect the waterflood recovery out of those acre feet, the farther up you go to be of a lower order.

Q I understood you to say that the Justice Anticline was a gas cap; is that correct?

A Yes, sir. There was and is a gas cap in the Queen Formation on top of the structure.

Q And that the gas cap has encroached to the west onto your proposed Langlie-Mattix Queen Unit?

A I am not certain that it has encroached. I am certain that it has always been there. It may have progressed down dip to some degree -- to some degree, it surely has. I'm not prepared to say how much.

Q Well, you know, from your study of this area, do you know of any wells on the eastern edge of your proposed unit that has shifted from oil to gas?

A No, sir.

Q Vice-versa?

A From gas to oil?

Q Yes.

A No, sir. One of the wells, the Pan-American Langlie B, No. 3, which is to the unit injector number 27 was initially completed as a gas well in the upper Queen. We intend to deepen that well to expose the oil saturation porosity that lies below and inject it -- assuming we find some oil saturated porosity below.

In like manner, the offsetting well to the south, the Cities Service, Dabs No. 1, penetrate only the upper part of the Queen and was completed open hole from somewhere above the Yates down into the upper part of the Queen and is produced as a gas well throughout its life.

I have an idea its production has come from the Yates. That's where it's been reported at least, and I am skeptical about the amount of fluid that entered the well out of the Queen Formation. I don't think it had much of it open.

Q Well, it would appear then, from your testimony, that the gas-oil contact on that has been relatively stationary?

A I don't intend to represent that it has or has not.

Q The purpose of your number 14 injector, would it be a fair statement to say that it is to push oil to the west, rather than to push some of your unit oil to the east, since you would be putting the second injection well in the same forty-acre tract?

A It is to prevent oil -- pushing oil off of the unit to the east up into what I interpreted as being a gas cap, with a high gas saturation. Where I am sure that little or none of it would ever be recovered.

It is intended to force oil to the producer which will be in the center of the pattern to the northwest and to the producer that will be in the pattern to the southwest.

Q If you are going to use a number 14, do you think the number 13 is necessary?

A Yes, sir. I've got to flood the adjoining pattern to the west, the 14 -- I don't believe I will ever get enough water into it to flood the pattern to the west or

provide an efficient sweep from any of the patterns that surround it.

MR. UTZ: Any further questions?

MR. HATCH: You have three production wells to be drilled and those were not included in this application?

THE WITNESS: No, sir. I have shown the locations that we intend to drill the wells at.

MR. UTZ: Were those standard locations?

THE WITNESS: No, sir. Twenty-six will be right on the section line. The others will be regular locations, unorthodox as to density.

MR. UTZ: You didn't request those; did you?

THE WITNESS: No, sir.

MR. UTZ: Any other questions? The witness may be excused. Statements?

Oh, did you have some more questions?

MR. SPERLING: Yes, and I wanted to offer my exhibits, Mr. Examiner, 1 through 7.

REDIRECT EXAMINATION

BY MR. SPERLING:

Q Mr. Kelly, do you think the approval of the unit agreement and the flood program which you have outlined here would be in the interest of the prevention of

waste and the protection of correlative rights in this unit area?

A Yes, sir.

Q I have the impression, Mr. Kelly, from your outlining of your program that there is a matter of some urgency in connection with the initiation of this flood; is that correct?

A Yes, sir.

Q Can you tell us why?

A We have -- we bought the properties that Mobil will contribute to this unit and also to the other unit, from George Buckles, on May 1. The commitments that we have made in connection with that purchase make it mandatory that we move very rapidly to the secondary recovery operation in the interest of preventing the loss of funds.

And accordingly, we have spared no effort to get this operation under way -- we have taken a lot of risk and carrying a lot of burden by ourselves until we could get an agreement from other parties.

And to that extent, it's very important that we start injection just as soon as we possibly can.

MR. SPERLING: Thank you. That's all I have. I did offer Exhibits 1 through 7, I believe?

THE REPORTER: Yes.

MR. UTZ: Without objection Exhibits 1 through 7 will be entered into the record of this case. And let's take a coffee break.

(Whereupon, a brief recess was taken.)

MICHAEL OSBORNE

the witness, called by Mr. Eaton, having first been duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. EATON:

Q. Will you please state your name, residence, occupation, and your employer?

A. My name is Michael Osborne, and I reside in Roswell, New Mexico. I am employed by Atlantic Richfield Company as an operations engineer.

Q. What is an operations engineers?

A. We work with production engineering -- petroleum engineering.

Q. Have you previously testified before the New Mexico Oil Conservation Commission as a petroleum engineer?

A. Yes, I have.

Q. Were your qualifications accepted at that time?

A. Yes, they were.

Q. Mr. Osborne, to make this as brief as possible, would you just give me Atlantic Richfield's position with respect to the application of Mobil in Case 4202?

A. Well, I am here on behalf of Atlantic Richfield Company today to oppose Mobil's proposal to drill an

unorthordox injection well, located six hundred and sixty feet to the north line and twelve hundred and twenty feet from the west line of Section 14, Township 25 South, Range 37 East.

This has been designated by Mobil, in their Unit, as Unit Well Number Fourteen, which, it has been previously testified, that they intend to drill in January or February of next year.

It is the belief of Atlantic Richfield that this well would rapidly water out the Atlantic Stuart A on Well Number One, located three hundred thirty feet from the north line and sixteen hundred and fifty feet from the west line of that same Section 14.

We feel that the Mobil Number Fourteen would water this well out, so rapidly that it would not make it economical for us to set a pumping unit on this well, which we have had shut in since 1963, saving it for secondary recovery in the area.

We feel that we would like our well included in the unit as an alternate to the Mobil Unit Well Number Fourteen. We feel the use of our well leads to a more efficient sweep of the Queen in this area and we believe that it would lead to the additional recovery of

approximately twelve thousand five hundred barrels of oil, over that which would be recovered by Mobil's Unit Well Fourteen.

Q. Is Atlantic willing to join the Mobil Unit?

A. Yes -- Atlantic has expressed an interest, at least orally, to Mobil, that we would like to be considered in their unit.

We have at this time, however, received no unit plans or economics or anything from them concerning this.

Q. Would Atlantic be willing to sell its well to Mobil if the parties could agree upon the proper parts?

A. Yes, we feel that if we could reach a reasonable price for the well, that we would be willing to sell it to Mobil.

Q. Is it Atlantic's position at this time that the location of Well Number Fourteen will not be in the interest of conservation and tend to cause waste and infringe upon the correlative rights?

A. This is our belief. The Atlantic Stuart Well, in primary production, recovered slightly over sixty-two thousand barrels of oil.

It is true that this area, under the Atlantic Reese Lease is an area of high gas saturation. However, we do feel

that there are still commercial reserves that could be recovered by conversion of our well to an injector as opposed to the use of Mobil's Unit Well Number Fourteen.

Q. Do you have anything else which you would like to add?

A. No, sir.

MR. EATON: That's all, Mr. Examiner.

CROSS EXAMINATION

BY MR. UTZ:

Q. You don't have any idea then what kind of deal you might be willing to accept as far as on this well as far as joint community is concerned? Not until you see the economics?

A. We feel that we would like to negotiate it further. We have established a price of approximately twenty-five thousand dollars, that we would be willing to sell the well for, and we feel that this is reasonable, in light of the fact that it would add additional reserves to the unit.

However, as far as percentage of the unit, should we be offered a chance to join, we cannot say at this time, because, as I say, we have not seen the study on this flood yet.

Q. Twenty-five thousand dollars would include the production under the lease; would it not?

A. Yes.

MR. UTZ: Any further questions?

CROSS EXAMINATION

BY MR. SPERLING:

Q. Yes, sir. Mr. Osborne, on what do you base your estimate as to incremental oil of twelve thousand five hundred barrels?

A. Well, I base this on the additional area of the sweep that could be obtained by using the Atlantic Well, as opposed to Unit Well Number Fourteen.

Q. Have you made any calculations as to oil in place of -- to support that figure?

A. I base this roughly on primary production, which generally is a good indicator of secondary recovery in this area.

Q. Do you have an opinion as to the source of the primary production?

A. We feel that the primary production was coming from the lower Queen stringers.

Q. Horizontally? The source?

A. I would say, primarily from the east -- no, from

the west, excuse me. Although I cannot say that all of it came from this direction, I feel that some of it was obtained from the east side of the Stuart Well Number One. Assuming, of course, that all of the production did come from the west side of the Atlantic Stuart Well Number One, this would tend to increase the recovery that we could attribute to any area swept to the west, since this is where the primary oil came from, this is the area we are going to sweep and recover oil from the secondary.

Q. Do you know whether or not, Mr. Osborne, there had been negotiations with reference to the sale and purchase of it?

A. Yes, there have been in the past -- well, just very recently, we received an offer from Mobil to purchase our well for twelve thousand dollars. This was an alternate suggestion that they had at that time -- they had planned to drill two injection wells in the south -- in the, well, just one hundred feet off of the northwest, and southwest corners of our lease. And they were requesting that we participate in the drilling of these two wells to the extent of approximately nineteen thousand dollars.

We did not feel that this would be in our best interests, because we would have been faced with the same

problem that we are now, except that instead of having Unit Well Number Fourteen where it is, it would be moved to approximately the same location north and west of our well.

And as an alternative, they suggested they would offer us twelve thousand dollars.

Q. Well, then negotiations have been in progress and are not necessarily concluded?

A. No, they are not.

Q. Well, what is your degree of confidence in the figure of twelve thousand five hundred, based upon the information you have, which I have understood was primarily on a primary production? In other words, do you think this is a pretty exact figure or what?

A. Well, the experience that I've had and the other people in Atlantic with me, I'm sure all of us can say that it's difficult to pin reserves down on this basis, that for a large unit area -- they hold fairly true -- a certain percent of primary oil will be produced in secondary. I would say in this case, reserves could possibly range from anywhere from, say, eight thousand barrels up to around sixteen thousand barrels. I strike a figure of twelve thousand five hundred as being sort of a medium point.

Q. Now, do I understand that that is the suggested figure as the basis for the calculation and participation in the unit; that that figure would be used?

A. I think something roughly around this -- I cannot say at this time.

MR. SPERLING: That's all, thank you.

RECROSS EXAMINATION

BY MR. UTZ:

Q. This well is not now producing; is it?

A. No, it is not. It has been shut in since 1963.

Q. Well, when it produced the sixty-two thousand barrels accumulative, was it flowing?

A. It was flowing, yes.

Q. And it produced that with a high gas-oil ratio, I presume?

A. Yes, it did.

Q. Any idea of the amount of pressure; the bottom hole pressure now?

A. No, I do not have any idea.

Q. You have no idea?

A. No.

MR. UTZ: Any other questions? The witness may be excused. Any other testimony?

MR. SPERLING: Mr. Examiner, for convenience and reference, and we have referred to this earlier -- we have a tabulation of production by year, from the Atlantic Stuart A, Well Number One, that would be of assistance, and we would like to submit it as an exhibit.

MR. UTZ: All right.

MR. SPERLING: Will you mark this as Exhibit Eight in Case 4202.

THE REPORTER: Yes, sir.

(Whereupon, the instrument was marked for identification as Applicant's Exhibit Number 8.)

MR. HATCH: I assume that the Commission will be notified as to the agreement that will be made --

MR. SPERLING: Yes, sir.

MR. UTZ: Mr. Sperling, you are requesting, in this order, administrative approval for further injection wells; are you not?

MR. SPERLING: Yes, sir.

MR. UTZ: Anything further in this case? The case will be taken under advisement.

(Whereupon, Exhibits 1 through 8 were admitted into evidence.)

I N D E X

E X H I B I T S

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, CA FENLEY, Court Reporter in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported to me, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Wintess my Hand and Seal this 14th day of November, 1969.

COURT REPORTER

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4201, heard by me on Nov. 27, 1969.

Examiner
New Mexico Oil Conservation Commission